

AMENDMENTS TO THE CLAIMS

1. (Original) A data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router, the mobile router comprising:

a plurality of communication means of a communication service containing a same or different types of services;

a control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other; and

a transferring means which receives a packet from the mobile network node to the correspondent node, selects usable communication means based on information of the control table, and transfers the packet to the home agent,

the home agent comprising:

means for identifying the address assigned to the usable communication means of the mobile router;

a control table which stores the identified address and route information of the address, such that the address and the route information are associated with each other; and

transferring means which receives a packet from the correspondent node addressed to the mobile network node, selects an address based on information of the control table, and transfers the packet to the address, wherein a logical line, through which the mobile network node and the correspondent node communicate with each other, is configured by combining lines of the plurality of communication means.

2. (Currently Amended) A data communication system comprising a home agent and a mobile router,

the mobile router comprising:

a plurality of communication means of a communication service containing same or different types of services;

a control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other; and

transferring means which receives a packet, selects usable communication means based on the control table, and transfers the packet to the home agent,

and home agent comprising:

means for identifying an address assigned to usable communication means of the mobile router;

a control table which stores the identified address and route information of the address, such that the address and the route information are associated with each other; and

transferring means which receives a packet, selects an address based on information of the control table, and transfers the packet to the address, wherein a logical line, through which the ~~mobile network node and the correspondent node home agent and the mobile router~~ communicate with each other, is configured by combining lines of the plurality of communication means.

3. (Original) A data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router, the mobile router comprising:

a plurality of communication means which communicate with the home agent;

a control table which stores route information containing an address assigned to the plurality of communication means; and

means for receiving a packet from the mobile network node addressed to the correspondent node, selecting at least one of the communication means based on information of the control table, and transferring the packet to the home agent,

the home agent comprising:

means for identifying an address assigned to usable communication means of the mobile router;

a control table which stores route information containing the identified address; and

means for receiving a packet from the correspondent node addressed to the mobile network node, selecting at least one address based on information of the control table, and transferring the packet to the address, wherein a logically multiplexed line, through which the mobile network and the correspondent node communicate with each other, is configured by combining the plurality of communication means between the mobile router and the home agent.

4. (Previously Presented) The data communication system according to claim 2, wherein the mobile router comprises: means for detecting a change in connection status of the communication means currently-in-use; and means for notifying the home agent of the change in connection status and an address assigned to the communication means, and the home agent comprises means for updating, based on the notification, information in the control table that manages an address of the communication means of the mobile router.

5. (Previously Presented) The data communication system according to claim 2, wherein

the mobile router comprises means for notifying the home agent of an address of the communication means scheduled to be disconnected before disconnecting a currently-connected line of the communication means, and

the home agent comprises means for deleting, based on the notification, information related to an address of the communication means which the home agent is notified of, from the control table.

6. (Previously Presented) The data communication system according to claim 2, wherein

the mobile router comprises means for notifying the home agent of an address of the communication means predicted to be disconnected when an event occurs where disconnection of a currently-connected line of the communication means is predictable, and the home agent comprises means for updating, based on the notification, information in a control table that manages the address of the mobile router.

7. (Previously Presented) The data communication system according to claim 2, wherein

the mobile router comprises means for responding to a packet from the home agent, and the home agent comprises means for regularly transmitting a packet to a plurality of addresses the mobile router has and means updating information in the control table that manages an address of the mobile router by determining the address as unusable if response is not made from the address to the packet.

8. (Previously Presented) The data communication system according to claim 2, wherein

the home agent comprises: means for estimating an address of usable communication means of the mobile router based on positional information of the mobile router,; and means for updating means for updating information in the control table that manages an address of the mobile router based on the estimation.

9. (Previously Presented) The data communication system according to claim 2, wherein the route information in the control table of the mobile router includes at least

one from a group of communication means or a kind of line, a packet delay, a bandwidth of the line, and usage information.

10. (Previously Presented) The data communication system according to claim 2, wherein the route information in the control table of the home agent includes at least one from a group of communication means or a kind of line, packet delay, a bandwidth of the line, and a timing enabling transmission of the next packet.

11. (Previously Presented) The data communication system according to claim 2, wherein the transferring means of the home agent is means for selecting an address to which transmission is possible by calculating a transmission timing based on the route information in the control table, so as not to generate a packet loss.

12. (Previously Presented) The data communication system according to claim 2, wherein the home agent selects a transmission timing and a destination address using means which is different depending on a QoS class of a received packet.

13. (Previously Presented) The data communication system according to claim 2, wherein the mobile router selects communication means using means which is different depending on a QoS class of a received packet.

14. (Previously Presented) The data communication system according to claim 2, wherein the mobile router comprises: means for monitoring a traffic amount of a mobile network node thereunder and means for connecting and disconnecting a channel to the outside based on the traffic amount.

15. (Previously Presented) The data communication system according to claim 2, wherein the mobile router comprises:

a control table which manages policy information mapped to respective communication means; and

transferring means, when transferring a packet to the home agent, which selects the communication means based on the policy information and transfers the packet,

and the home agent comprises:

a control table which manages policy information mapped to respective addresses of the mobile router; and

transferring means, when transferring a packet to the mobile router, which selects an address of the mobile router based on the policy information and transfers the packet, wherein utilization of a plurality of communication means is determined between the home agent and the mobile router, based on the policy information.

16. (Original) The data communication system according to claim 15, wherein the policy information is information on a communication fee of individual communication means.

17. (Previously Presented) The data communication system according to claim 15, wherein utilization of individual communication means is determined based on the policy information, such that a total of the communication fees is minimized.

18. (Previously Presented) The data communication system according to claim 15, wherein

when it is assumed that:

the communication means adopts a measured-rate billing system;

the data communication system comprises “N” units of communication means, that is, a first to the N^{th} communication means;

information on the communication fee is given such that:

the first communication means has a communication unit price of a_1 , and a bandwidth of B_1 ;

the second communication means has a communication unit price of a_2 ($>a_1$), and a bandwidth of B_2 ;

as repeated in the same manner hereafter,

the N th communication means has a communication unit price of a_N ($>a(N-1)$) and a bandwidth of B_N , and

a bandwidth required for current communication is C ;

the data communication system:

finds the largest M which satisfies the inequality: $C \geq B_1 + B_2 + \dots + B_M$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the M^{th} communication means; and

uses $C - B_1 - B_2 - \dots - B_M$ from of the bandwidth of the $(M+1)^{\text{th}}$ communication means, thereby using a line such that a total of the communication fees is minimized.

19. (Previously Presented) The data communication system according to claim 16, which uses communication means adopting a flat-rate billing system in preference to communication means adopting a measured-rate billing system.

20. (Previously Presented) The data communication system according to claim 16, wherein

when it is assumed that:

the first to M^{th} communication means adopts a flat-rate billing system;

the M^{th} to N^{th} communication means adopts a measured-rate billing system;

the data communication system comprises “ N ” units of communication means, that is, the first to the N^{th} communication means;

a total bandwidth of the first to M^{th} communication means is B_0 ,

the information on the communication fee is given such that:

the $(M+1)^{th}$ communication means has a communication unit price of $a(M+1)$, and a bandwidth of $B(M+1)$; and the $(M+2)^{th}$ communication means has a communication unit price of $a(M+2)$ ($>a(M+1)$), and a bandwidth of $B(M+2)$;

as repeated in the same manner hereafter,

the N^{th} communication means has a communication unit price of aN ($>a(N-1)$) and a bandwidth of BN , and

a bandwidth required for current communication is C ,

the data communication system:

if $C \leq B0$, uses one of the first to M^{th} communication means, and

if $C > B0$, finds the largest L which satisfies the inequality: $C \geq B0+B1+B2+\dots+BL$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the L^{th} communication means; and

uses $C-B1-B2-\dots-BL$ of the bandwidth of the $(L+1)^{th}$ communication means, thereby using a line such that a total of the communication fees is minimized.

21. (Previously Presented) The data communication system according to claim 16, wherein a communication fee is changed in accordance with a date and time, and utilization of individual communication means is changed in accordance with this change.

22. (Previously Presented) The data communication system according to claim 15, wherein the mobile router and the home agent change the policy information based on positional information of the mobile router.

23. (Previously Presented) The data communication system according to claim 16, wherein a communication fee is changed in accordance with a place, and utilization of individual communication means is changed in accordance with this change.

24. (Previously Presented) The data communication system according to claim 15, wherein the home agent comprises means for distributing the policy information including the policy information in the response message when receiving notification of an address from the mobile router.

25. (Previously Presented) The data communication system according to claim 2, wherein the mobile router comprises sequence control means which controls a sequence of a received packets.

26. (Previously Presented) The data communication system according to claim 2, characterized in that the home agent comprises sequence control means which controls a sequence of received packets.

27. (Original) A mobile router in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router,; and a mobile network node capable of communicating with the mobile router, the mobile router comprising:

a plurality of communication means of a communication service containing same or different types of services;

a control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other; and

transferring means which receives a packet from the mobile network node addressed to the correspondent node, selects usable communication means based on information of the control table, and transfers the packet to the home agent,

wherein a logical line, through which a packet addressed to the correspondent node from the mobile network node is transferred to the home agent, is configured by combining lines of the plurality of communication means.

28. (Original) A mobile router in a data communication system comprising a home agent and a mobile router,

the mobile router comprising:

a plurality of communication means of a communication service containing same or different types of services;

a control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other; and

transferring means which receives a packet, selects usable communication means based on the control table, and transfers the packet to the home agent,

wherein a logical line, through which the mobile router and the home agent communicate to each other, is configured by combining lines of the plurality of communication means.

29. (Original) A mobile router in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router, the mobile router comprising:

a plurality of communication means which communicate with the home agent;

a control table which stores route information containing an address assigned to the plurality of communication means; and

transferring means which receives a packet from the mobile network node addressed to the correspondent node, selecting at least one of the communication means based on information of the control table, and transfers the packet to the home agent,

wherein a logically multiplexed line, through which a packet addressed to the correspondent node from the mobile network node is transferred to the home agent, is configured by combining lines of the plurality of communication means.

30. (Previously Presented) The mobile router according to claim 28, further comprising:

means for detecting a change in connection status of the communication means currently-in-use; and

means for notifying the home agent of the change in connection status and an address assigned to the communication means.

31. (Previously Presented) The mobile router according to claim 28, further comprising:

means for notifying the home agent of an address of the communication means scheduled to be disconnected, before disconnecting a currently-connected line of the communication means.

32. (Previously Presented) The mobile router according to claim 28, further comprising:

means for notifying the home agent of an address of the communication means predicted to be disconnected, when an event occurs where disconnection of a currently-connected line of the communication means is predictable.

33. (Previously Presented) The mobile router according to claim 28, further comprising:

means for responding to a packet from the home agent for investigating a usable address.

34. (Previously Presented) The mobile router according to claim 28, wherein the route information in the control table of the mobile router includes at least one from a group of communication means or a kind of line, a packet delay, a bandwidth of the line, or usage information.

35. (Previously Presented) The mobile router according to claim 28, wherein the mobile router selects communication means using means which is different depending on a QoS class of a received packet.

36. (Previously Presented) The mobile router according to claim 28, further comprising:

means for monitoring a traffic amount of a mobile network node thereunder; and

means for connecting and disconnecting a channel to the outside based on the traffic amount.

37. (Previously Presented) The mobile router according to claim 28, the mobile router comprises:

a control table which manages policy information mapped to respective communication means; and

transferring means, when transferring a packet to the home agent, which selects the communication means based on the policy information and transfers the packet,

wherein utilization of a plurality of communication means is determined based on the policy information.

38. (Original) The mobile router according to claim 37, wherein the policy information is information on a communication fee of individual communication means.

39. (Previously Presented) The mobile router according to claim 37, wherein the transferring means determines utilization of individual communication means based on the policy information, such that a total of the communication fees is minimized.

40. (Previously Presented) The mobile router according to claim 37, wherein when it is assumed that:

the communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the N^{th} communication means;

information on the communication fee is given such that:

the first communication means has a communication unit price of a_1 , and a bandwidth of B_1 ;

the second communication means has a communication unit price of $a_2 (>a_1)$, and a bandwidth of B_2 ;

as repeated in the same manner hereafter,

the N^{th} communication means has a communication unit price of $a_N (>a(N-1))$ and a bandwidth of B_N , and

a bandwidth required for current communication is C ,

the mobile router:

finds the largest M which satisfies the inequality: $C \geq B_1+B_2+\dots+B_M$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the M^{th} communication means; and

uses $C-B_1-B_2-\dots-B_M$ of the bandwidth of the $(M+1)^{\text{th}}$ communication means, thereby

using a line such that a total of the communication fees is minimized.

41. (Previously Presented) The mobile router according to claim 38, which uses communication means adopting a flat-rate billing system in preference to communication means adopting a measured-rate billing system.

42. (Previously Presented) The mobile router according to claim 38, wherein when it is assumed that:

the first to Mth communication means adopts a flat-rate billing system;

the Mth to Nth communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

a total bandwidth of the first to Mth communication means is B0,

the information on the communication fee is given such that:

the (M+1)th communication means has a communication unit price of a(M+1), and a bandwidth of B(M+1); and the (M+2)th communication means has a communication unit price of a(M+2) (>a(M+1)), and a bandwidth of B(M+2);

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of aN (>a(N-1)) and a bandwidth of BN, and

a bandwidth required for current communication is C,

the mobile router:

if $C \leq B0$, uses one of the first to Mth communication means, and

if $C > B0$, finds the largest L which satisfies the inequality: $C \geq B0 + B1 + B2 + \dots + BL$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the Lth communication means; and

uses C-B1-B2- ... -BL of the bandwidth of the (L+1) th communication means, thereby

using a line such that a total of the communication fees is minimized.

43. (Previously Presented) The mobile router according to claim 38, wherein a communication fee is changed in accordance with a date and time, and utilization of individual communication means is changed in accordance with this change.

44. (Previously Presented) The mobile router according to claim 37, wherein the mobile router changes the policy information based on positional information of the mobile router.

45. (Previously Presented) The mobile router according to claim 38, wherein a communication fee is changed in accordance with a place, and utilization of individual communication means is changed in accordance with this change.

46. (Previously Presented) The mobile router according to claim 28, characterized in that the mobile router comprises sequence control means which controls a sequence of received packets.

47. (Original) A home agent in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router, the home agent comprising:

means for identifying an address assigned to usable communication means among communication means of a communication service containing same or different types of services of the mobile router;

a control table which stores the identified address and route information of the address, such that the address and the route information are associated with each other; and

transferring means which receives a packet addressed to the mobile network node from the correspondent node, selects the address based on the control table, and transfers the packet to the address,

wherein a logical line, through which a packet addressed to the mobile network node is transferred to the mobile router, is configured by combining lines of the plurality of communication means.

48. (Currently Amended) A home agent in a data communication system comprising a home agent and a mobile router,

the home agent comprises:

means for identifying an address assigned to usable communication means among communication means of a communication service containing same or different types of services of the mobile router;

a control table which stores the identified address and route information of the ~~adders address~~, such that the address and the route information are associated with each other; and

means which receives a packet, selects an address based on information of the control table, and transfers the packet to the address,

wherein a logical line, through which the home agent communicates with the mobile router, is configured by combining lines of the plurality of communication means.

49. (Original) A home agent in a data communication system configured by a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router, the home agent comprising:

means for identifying an address assigned to usable communication means of the mobile router;

a control table which stores route information containing the identified address; and

means for receiving a packet addressed to the mobile network node from the correspondent node, selecting at least one of the addresses of the mobile router based on the control table, and transferring the packet to the address;

wherein a logically multiplexed line, through which the home agent communicates with the mobile router, is configured by combining lines of the plurality of communication means.

50. (Previously Presented) The home agent according to claim 48, further comprising:

means for updating the information of the control table that manages an address of the communication means of the mobile router, based on a change in connection status with the mobile router and notification of the address assigned to the communication means.

51. (Currently Amended) The home agent according to claim 48, further comprising:

means for deleting from the control table, information related to an address of the communication means which the home agent is notified of, based on notification of an address of the communication means scheduled to be disconnected from the mobile ~~connector~~ router.

52. (Previously Presented) The home agent according to claim 48, further comprising:

means for updating information in a control table that manages an address of the mobile router, based on notification of an address of the communication means predicted to be disconnected from the mobile router.

53. (Previously Presented) The home agent according to claim 48, further comprising:

means for regularly transmitting a packet to a plurality of addresses the mobile router has; and

means for determining an address as unusable if no response is made to the packet from the address, and updating information in a control table that manages an address of the mobile router.

54. (Previously Presented) The home agent according to claim 48, further comprising:

means for estimating an address of usable communication means of the mobile router based on positional information of the mobile router; and means for updating information in a control table that manages an address of the mobile router, based on the estimation.

55. (Previously Presented) The home agent according to claim 48, wherein the route information in the control table of the home agent includes at least one from a group of communication means or a kind of line, a packet delay, a bandwidth of the line, and a timing enabling transmission of the next packet.

56. (Previously Presented) The home agent according to claim 48, wherein the transferring means of the home agent is means for selecting an address to which transmission is possible by calculating a transmission timing based on the route information in the control table, so as not to generate a packet loss.

57. (Previously Presented) The home agent according to claim 48, wherein the home agent selects a transmission timing and a destination address using means which is different depending on a QoS class of a received packet.

58. (Previously Presented) The home agent according to claim 48, wherein the home agent comprises:

a control table which manages policy information mapped to respective addresses of the mobile router; and

transferring means, when transferring a packet to the mobile router, which selects an address of the mobile router based on the policy information and transfers the packet,

wherein utilization of a plurality of communication means is determined based on the policy information between the home agent and the mobile router.

59. (Original) The home agent according to claim 58, wherein the policy information is information on a communication fee of individual communication means.

60. (Previously Presented) The home agent according to claim 58, wherein the transferring means determines utilization of individual communication means based on the policy information, such that a total of the communication fees is minimized.

61. (Previously Presented) The home agent according to claim 58, wherein when it is assumed that:

the communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

information on the communication fee is given such that:

the first communication means has a communication unit price of a_1 , and a bandwidth of B_1 ;

the second communication means has a communication unit price of $a_2 (>a_1)$, and a bandwidth of B_2 ;

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of $a_N (>a(N-1))$ and a bandwidth of B_N , and

a bandwidth required for current communication is C ,

the home agent:

finds the largest M which satisfies the inequality: $C \geq B_1+B_2+\dots+B_M$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the M th communication means; and

uses $C-B_1-B_2-\dots-B_M$ of the bandwidth of the $(M+1)$ th communication means, thereby

using a line such that a total of the communication fees is minimized.

62. (Previously Presented) The home agent according to claim 59, wherein the home agent uses communication means adopting a flat-rate billing system in preference to communication means adopting a measured-rate billing system.

63. (Previously Presented) The home agent according to claim 59, wherein when it is assumed that:

the first to Mth communication means adopts a flat-rate billing system;

the Mth to Nth communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

a total bandwidth of the first to Mth communication means is B0,

the information on the communication fee is given such that:

the (M+1)th communication means has a communication unit price of a(M+1) and a bandwidth of B(M+1); and the (M+2)th communication means has a communication unit price of a(M+2) ($>a(M+1)$) and a bandwidth of B(M+2);

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of aN ($>a(N-1)$) and a bandwidth of BN, and

a bandwidth required for current communication is C,

the data communication system:

if $C \leq B0$, uses one of the first to Mth communication means, and

if $C > B0$, finds the largest L which satisfies the inequality: $C \geq B0 + B1 + B2 + \dots + BL$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the Lth communication means; and

uses C-B1-B2- ... -BL of the bandwidth of the (L+1)th communication means, thereby using a line such that a total of the communication fees is minimized.

64. (Previously Presented) The home agent according to claim 59, wherein a communication fee is changed in accordance with a date and time, and utilization of individual communication means is changed in accordance with this change.

65. (Previously Presented) The home agent according to claim 58, wherein the home agent changes the policy information based on positional information of the mobile router.

66. (Previously Presented) The home agent according to claim 59, wherein a communication fee is changed in accordance with a place, and utilization of individual communication means is changed in accordance with this change.

67. (Previously Presented) The home agent according to claim 58, further comprising means for distributing the policy information including the policy information in the response message when receiving notification of an address from the mobile router.

68. (Previously Presented) The home agent according to claim 48, further comprising sequence control means which controls a sequence of a received packets.

69. (Original) A program of a mobile router in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent; a mobile router; and a mobile network node capable of communicating with the mobile router,

the program causing the mobile router to function as a plurality of communication means of a communication service containing a same or different types of services;

to function as transferring means which receives a packet from the mobile network node to the correspondent node, selects usable communication means based on information of the control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other, and transfers the packet to the home agent,

wherein a logical line, through which a packet addressed to the correspondent node from the mobile network node is transferred to the home agent, is configured by combining lines of the plurality of communication means.

70. (Original) A program of a mobile router in a data communication system comprising a home agent and a mobile router,

the program causing the mobile router

to function as a plurality of communication means of a communication service containing a same or different types of services;

to function as transferring means which receives a packet, selects usable communication means based on the control table which stores an address assigned to the communication means and route information of the communication means, such that the address and the route information are associated with each other, and transfers the packet to the home agent,

wherein a logical line, through which the mobile router and the home agent communicate to each other, is configured by combining lines of the plurality of communication means.

71. (Original) A program of a mobile router in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router,

the program causing the mobile router

to function as a plurality of communication means to communicate with the home agent;

to function as a control table which stores route information assigned to the plurality of communication means; and

to function as means which receives a packet from the mobile network node addressed to the correspondent node, selects at least one of the communication means based on the control table, and transfers the packet to the home agent,

wherein a logically multiplexed line, through which a packet addressed to the correspondent node from the mobile network node is transferred to the home agent, is configured by combining lines of the plurality of communication means.

72. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to

function as means for detecting a change in connection status of the communication means currently-in-use; and

to function as means for notifying the home agent of the change in connection status and an address assigned to the communication means.

73. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to function as means for notifying the home agent of an address of the communication means scheduled to be disconnected, before disconnecting a currently-connected line of the communication means.

74. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to function as means for notifying the home agent of an address of the communication means predicted to be disconnected, when an event occurs where disconnection of a currently-connected line of the communication means is predictable.

75. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to function as means for responding to a packet from the home agent for investigating a usable address.

76. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes so that the route information in the control table of the mobile router includes at least one from a group of communication means or a kind of line, a packet delay, a bandwidth of the line, and usage information.

77. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes to selects communication means using means which is different depending on a QoS class of a received packet.

78. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router

to function as means for monitoring a traffic amount of a mobile network node thereunder; and

to function as means for connecting and disconnecting a channel to the outside based on the traffic amount.

79. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to function as transferring means, when transferring a packet to the home agent, which selects the communication means based on the policy information mapped to respective communication means,

wherein utilization of a plurality of communication means is determined based on the policy information.

80. (Original) The program of the mobile router according to claim 79, wherein the program causes so that the policy information is information on a communication fee of individual communication means.

81. (Previously Presented) The program of the mobile router according to claim 79, wherein the program causes so that the transferring means determines utilization of individual communication means based on the policy information, such that a total of the communication fees is minimized.

82. (Previously Presented) The program of the mobile router according to claim 80, wherein

when it is assumed that:

the communication means adopts a measured-rate billing system;

the data communication system comprises “N” units of communication means, that is, the first to the Nth communication means;

the information on the communication fee is given such that:

the first communication means has a communication unit price of a_1 , and a bandwidth of B_1 ;

the second communication means has a communication unit price of a_2 ($>a_1$), and a bandwidth of B_2 ;

as repeated in the same manner hereafter,

the N th communication means has a communication unit price of a_N ($>a(N-1)$) and a bandwidth of B_N , and

a bandwidth required for current communication is C ,

the program:

finds the largest M which satisfies the inequality: $C \geq B_1 + B_2 + \dots + B_M$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the M th communication means; and

uses $C - B_1 - B_2 - \dots - B_M$ of the bandwidth of the $(M+1)$ th communication means, thereby

using a line such that a total of the communication fees is minimized.

83. (Previously Presented) The program of the mobile router according to claim 80, wherein the program causes to use communication means adopting a flat-rate billing system in preference to communication means adopting a measured-rate billing system.

84. (Previously Presented) The program of the mobile router according to claim 80, wherein

when it is assumed that:

the first to M th communication means adopts a flat-rate billing system;

the M th to N th communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

a total bandwidth of the first to Mth communication means is B_0 ,

the information on the communication fee is given such that:

the $(M+1)$ th communication means has a communication unit price of $a(M+1)$, and a bandwidth of $B(M+1)$; and the $(M+2)$ th communication means has a communication unit price of $a(M+2)$ ($>a(M+1)$), and a bandwidth of $B(M+2)$;

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of a_N ($>a(N-1)$) and a bandwidth of B_N , and

a bandwidth required for current communication is C ,

the program:

if $C \leq B_0$, uses one of the first to Mth communication means, and

if $C > B_0$, finds the largest L which satisfies the inequality: $C \geq B_0 + B_1 + B_2 + \dots + B_L$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the L th communication means; and

uses $C - B_1 - B_2 - \dots - B_L$ of the bandwidth of the $(L+1)$ th communication means, thereby

using a line such that a total of the communication fees is minimized.

85. (Previously Presented) The program of the mobile router according to claim 80, wherein the program causes so that the communication fee is changed in accordance with a date and time, and utilization of individual communication means is changed in accordance with this change.

86. (Previously Presented) The program of the mobile router according to claim 79, wherein the program causes to change the policy information based on positional information of the mobile router.

87. (Previously Presented) The program of the mobile router according to claim 80, wherein the program causes so that the communication fee is changed in accordance with a place, and utilization of individual communication means is changed in accordance with this change.

88. (Previously Presented) The program of the mobile router according to claim 70, wherein the program causes the mobile router to function as sequence control means which controls a sequence of a received packets.

89. (Original) A program of a home agent in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router,

the program causing the home agent

to function as means for identifying an address assigned to the communication means which is usable among the communication means of a communication service containing a same or different types of services;

and

to function as transferring means which receives a packet from the correspondent node to the mobile network node, selects an address based on information of the control table which stores the identified address and route information of the

address, such that the address and the route information are associated with each other, and transfers the packet to the address,

thereby configuring a logical line by combining lines of the plurality of communication means, and transferring a packet from the correspondent node addressed to the mobile network node through this line to the mobile router.

90. (Original) A program of a home agent in a data communication system comprising a home agent and a mobile router,

the program causing the home agent

to function as means for identifying an address assigned to the communication means which is usable among the communication means of a communication service containing same or different types of services;

and

to function as transferring means which receives a packet, selects an address based on information of the control table which stores the identified address and route information of the address, such that the address and the route information are associated with each other, and transfers the packet to the address,

thereby configuring a logical line by combining lines of the plurality of communication means, and communicating with the mobile router through this line.

91. (Original) A program of a home agent in a data communication system comprising a home agent, a correspondent node capable of communicating with the home agent, a mobile router, and a mobile network node capable of communicating with the mobile router,

the program causing the home agent

to function as means for identifying an address assigned to the usable communication means of the mobile router;

to function as a control table which stores route information containing the identified address; and

to function as means which receives a packet from the correspondent node to the mobile network node, selects at least one of the addresses of the mobile router based on the control table, and transfers the packet to the address,

thereby communicating with the mobile router through a logically multiplexed line configured by combining lines of the plurality of communication means.

92. (Previously Presented) The program of a home agent according to claim 90, characterized in that the program causes the home agent to function as means for updating information in the control table that manages an address of the communication means of the mobile router, based on notification of a change in connection status and an address assigned to the communication means.

93. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent to function as means for deleting from the control table, information related to the address of the communication means which the home agent is notified of, based on the notification of an address scheduled to be disconnected from the mobile router.

94. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent to function as means for updating information in a control table that manages an address of the mobile router, based on notification of an address of the communication means predicted to be disconnected from the mobile router.

95. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent

to function as means for regularly transmitting a packet to a plurality of addresses the mobile router has; and

to function as means for determining an address as unusable if no response is not made to the packet from the address, and updating information in the control table that manages an address of the mobile router.

96. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent

to function as means for estimating, based on positional information of the mobile router, an address of usable communication means of the mobile router; and

to function as means for updating, based on the estimation, information in the control table that manages an address of the mobile router.

97. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes so that the route information in the control table of the home agent includes at least one from a group of communication means or line, a packet delay, a bandwidth of the line, and a timing enabling transmission of the next packet.

98. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes so that the transferring means of the home agent is means for selecting an address to which transmission is possible by calculating a transmission timing based on the route information in the control table, so as not to generate a packet loss.

99. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes to selects a transmission timing and a destination address using means which is different depending on a QoS class of a received packet.

100. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent

to function as transferring means, when transferring a packet to the mobile router, which selects the address of the mobile router based on the policy information mapped to respective addresses of the mobile router, and transfers the packet, and

to determines utilization of a plurality of communication means with the mobile router based on the policy information.

101. (Original) The program of a home agent according to claim 100, wherein the program causes so that the policy information refers to information on a communication fee of individual communication means.

102. (Previously Presented) The program of a home agent according to claim 100, wherein the program causes so that the transferring means determines utilization of individual communication means based on the policy information, such that a total of the communication fees is minimized.

103. (Previously Presented) The program of a home agent according to claim 101, wherein

when it is assumed that:

the communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

information on the communication fee is given such that:

the first communication means has a communication unit price of a_1 , and a bandwidth of B_1 ;

the second communication means has a communication unit price of $a_2 (>a_1)$, and a bandwidth of B_2 ;

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of $a_N (>a(N-1))$ and a bandwidth of B_N , and

a bandwidth required for current communication is C ,

the program:

finds the largest M which satisfies the inequality: $C \geq B_1 + B_2 + \dots + B_M$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the M th communication means; and

uses $C - B_1 - B_2 - \dots - B_M$ of the bandwidth of the $(M+1)$ th communication means, thereby

using a line such that a total of the communication fees is minimized.

104. (Previously Presented) The program of a home agent according to claim 101, wherein the program causes to use communication means adopting a flat-rate billing system in preference to communication means adopting a measured-rate billing system.

105. (Previously Presented) The program of a home agent according to claim 101, wherein

when it is assumed that:

the first to Mth communication means adopts a flat-rate billing system;

the Mth to Nth communication means adopts a measured-rate billing system;

the data communication system comprises "N" units of communication means, that is, the first to the Nth communication means;

a total bandwidth of the first to Mth communication means is B_0 ,

the information on the communication fee is given such that:

the $(M+1)$ th communication means has a communication unit price of $a(M+1)$, and a bandwidth of $B(M+1)$; and the $(M+2)$ th communication means has a communication unit price of $a(M+2)$ ($>a(M+1)$), and a bandwidth of $B(M+2)$;

as repeated in the same manner hereafter,

the Nth communication means has a communication unit price of aN ($>a(N-1)$) and a bandwidth of BN , and

a bandwidth required for current communication is C ,

the data communication system:

if $C \leq B_0$, uses one of the first to Mth communication means, and

if $C > B_0$, finds the largest L which satisfies the inequality: $C \geq B_0 + B_1 + B_2 + \dots + B_L$, when the bandwidths of the communication means are sequentially added starting from that of the first communication means;

uses all the bandwidths of the first to the L th communication means; and

uses $C - B_1 - B_2 - \dots - B_L$ of the bandwidth of the $(L+1)$ th communication means, thereby

using a line such that a total of the communication fees is minimized.

106. (Previously Presented) The program of a home agent according to claim 101, wherein the program causes so that a communication fee is changed in accordance with a date and time, and utilization of individual communication means is changed in accordance with this change.

107. (Previously Presented) The program of a home agent according to claim 100, wherein the program causes to changes the policy information based on positional information of the mobile router.

108. (Previously Presented) The program of a home agent according to claim 101, wherein the program causes so that a communication fee is changed in accordance with a place, and utilization of individual communication means is changed in accordance with this change.

109. (Previously Presented) The program of a home agent according to any one of claims 100 to 107, wherein the program causes the home agent to function as distributing means for including the policy information in the response message when receiving notification of an address from the mobile router, and distributing the policy information to the mobile router.

110. (Previously Presented) The program of a home agent according to claim 90, wherein the program causes the home agent to have sequence control means which controls a sequence of a received packets.